

# Active and Collaborative Learning

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Quick and powerful ACL  
techniques

**Liang Niestemski**  
**Jennifer Mallory**

*Adapted from faculty of Lawrence  
Technological University*

# Active and Collaborative Learning

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Anyone? Anyone ?



<https://youtu.be/uhiCFdWeQfA>

# Active and Collaborative Learning

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Quick and powerful ACL techniques: Informal

## **Level 1 – easy, high-impact, low-effort**

- Think Pair Share
- Think Pair Write Share
- Quick Thinks
- Minute Paper/Muddiest Point
- Random Calling

# Level 1 - Informal ACL

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- Can be used at any time in any class
- Typically short duration
- Provides an opportunity for students to process material they have been listening to (Cognitive Rehearsal)
- May be used to break up a long lecture - "book ends" procedure

# Level 1 - Informal ACL

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# Level 1 - Informal ACL

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- 1) If an activity doesn't appeal to you, don't use it!  
(faculty comfort level!)
- 2) Don't make these activities a chore or burden!
- 3) Don't try activities on students **before** you try on yourself (or other faculty)!
- 4) Allow for **more time** than you think you need to carry out and respond
- 5) Make sure to "close the loop" – let students know results/changes

# ACL Activities

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- Think Pair Share (formal or informal ACL)
- Write Pair Share (formal or informal ACL)
- Quick Thinks (individual or informal ACL)
- Minute Papers (individual ACL)

# Think-Pair-Share

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- Pose a question
- Give **time** for students to THINK
  - This is very hard for faculty to do!!
- Have students PAIR up
  - Can be informal pairs (neighbors) or formal
- They discuss their answers – compare
  - Try to decide on common answer
  - Variation – have them find someone that disagrees with them!
- SHARE their answers with class
  - You could randomly call on one of the pairs



# How could you call on students?

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1. Common: Ask the question – pause – call on a student (randomly?) – pros/cons?
2. Directed: Call on a student (randomly) – pause – ask the question - pros/cons?
3. Volunteer: Ask the question – pause – (wait for a raised hand) - pros/cons?
4. Jump ball: Ask the question – pause – “Anybody?” - pros/cons?
5. Choir: Ask the question – pause – “Everybody” - pros/cons?

# Random Calling

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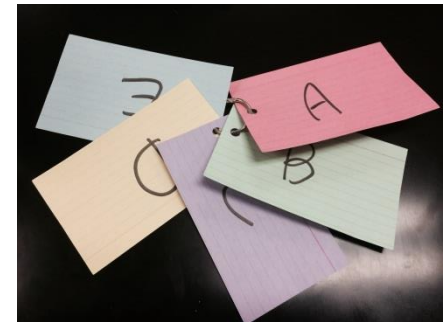
- Keep students focused – know they could be called on randomly
  - Avoids having “best/loudest/outgoing” students dominating with answers
- Multi-sided dice
- Facts (birth months, drive time, hometown, etc.)
- Random Generator (excel)
  - CTL Resource (add student names – CTRL-F9 to reshuffle)
- Popsicle sticks with names on one end
  - Have container – sticks go in, names down
  - After choosing stick – leave out, or return?
- Ask question first – then pick student!!



# Think-Pair-Share variations

A	B	A	B
C	D	C	D
E	F	E	F

- Clickers
- Letter cards
  - Show vote to YOU, not to others in class
  - Not “anonymous” – maybe take more care?
  - Quick and low-tech! (Color?)



- Colored Index cards
- Fingers



Based on % correct – go on, or go back?

A	B	A	B
C	D	C	D
E	F	E	F

# Think-Pair-Share Example

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## A sudden gust of wind

A curtain hangs straight down in front of an open window. A sudden gust of wind blows past the window; and the curtain is pulled out of the window. Which one of the following statements is the best explanation for this observation?

- A) The air pressure outside the window is more than the air pressure inside, pulling the curtain out.
- B) The air pressure outside the window is less than the air pressure inside, pulling the curtain out.
- C) The curtain would be pushed in, not pulled out.
- D) The air pressure inside the house is more than the air pressure outside, pushing the curtain out.
- E) The wind pulls the curtains out as it moves by.

# Think-Pair-Share Students Feedback

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94% students agree that the in-lecture clicker questions add to their understanding and interest in the course.

# Think-Pair-Share variations

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- polleverywhere

<https://www.polleverywhere.com/>

What Are Possible Types of ThinkPairShare questions?

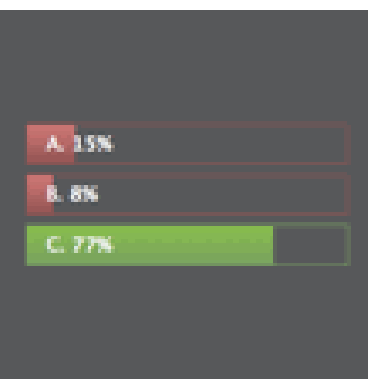
# Possible Types of ThinkPairShare questions

- Multiple choice (clicker questions)
  - Hopefully more discussion needed
- Ranking tasks (RT) (maybe only w/ calculations?)
  - Who is more to blame? Who is more honorable?
- Conflicting Contentions Task (CCT)
  - Give possible answers to question – students decide which answer is best
- What if anything is Wrong Task (WWT)
  - Show a solution/conclusion/hypothesis – is it correct, if not what is flawed?

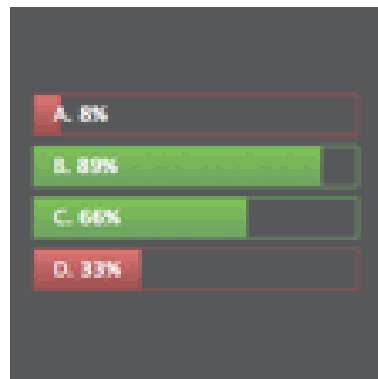
# Think-Pair-Share variations

- Learning catalytics

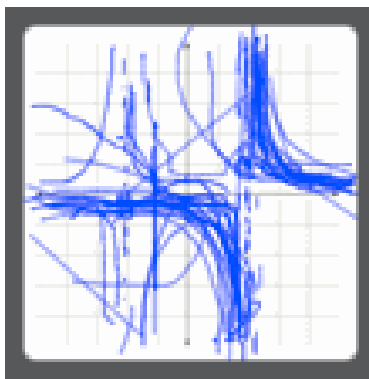
<https://learningcatalytics.com/>



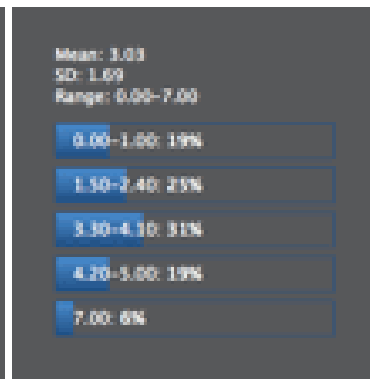
Confidence



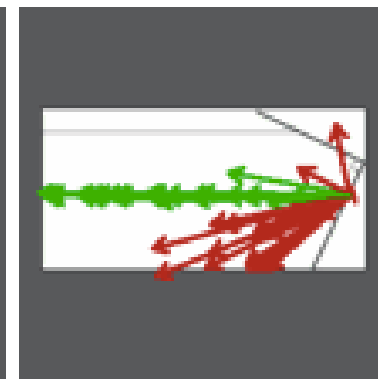
Many Choices



Composition Sketch



Data Collection  
(histogram)



Direction

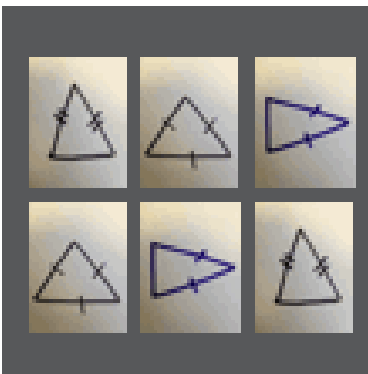


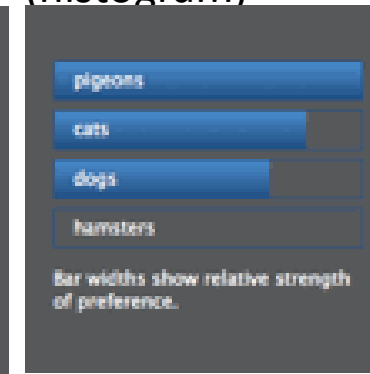
Image Upload

- The E field effort to push an electron across the distance of the wire.
- resistance of wires
- The internal resistance in the battery
- Internal resistance of the battery

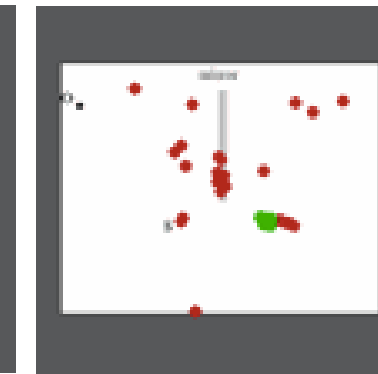
Free Response



Ranking



Priority



Region



# Think-Write-Pair-Share

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***Consider a window air conditioner placed on a table in a room and operated.***

**Will the room temperature increase, decrease, or remain the same? WHY?**

1. Think to yourself. Determine an answer.
2. Compare notes with the person next to you and justify your answer.
3. As a pair, conclude to a final answer and be prepared to share.

# How to get TWPS questions?

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- Search for “clicker” questions
- Textbook (FE exam questions)
- Make them up yourself!

# Formulate/Share/Listen/Create

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1. **Formulate** your answer to the question individually.
2. **Share** your answer with your partner.
3. **Listen** carefully to your partner's answer. Note similarities and differences in your answers.
4. **Create** a new answer that incorporates the best of the ideas. Be prepared to present your answer if called upon.

Good for problems with multiple possible solutions

# Quick Thinks

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- A very quick think – with feedback for the instructor



# Quick Thinks

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- Reorder the steps of a solution
  - Paraphrase the idea
  - Correct the error
  - Support a statement
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- Johnston, S. & Cooper, J. 1997. Quick thinks: Active- thinking in lecture classes and televised instruction. *Cooperative learning and college teaching*, 8(1), 2-7.

# Quick Thinks

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- **Example: think of one ACL technique you can use in your own class. How you would implement it?**
- Be prepared to explain your example to the audience.

# Minute Paper

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- What was the most useful or meaningful thing you learned during this session?
- What question(s) remain uppermost in your mind as we end this session?
- What was the “muddiest” point in this session?
- Give an example or application
- Explain in your own words . . .

Angelo, T.A. & Cross, K.P. 1993. Classroom assessment techniques: A handbook for college teachers. San Francisco: Jossey Bass.

# Minute Paper

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- Example:

- What was the most useful thing you learned during this session?
- What question(s) remain uppermost in your mind as we end this session?



# Five Minute Paper

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- Time at end of class – or before next class
  - Index cards? Slips of paper? Bb tools?
- Prompt with question:
  - "What was the most important thing you learned during this class? List 3 items."
  - or synthesize... "Who does What? To Whom, When, Where, How, and Why [WDWWWHW]?"
  - Or specific : "How could you prove that momentum and energy are both conserved in a collision?"
- Collect slips – **then what?**

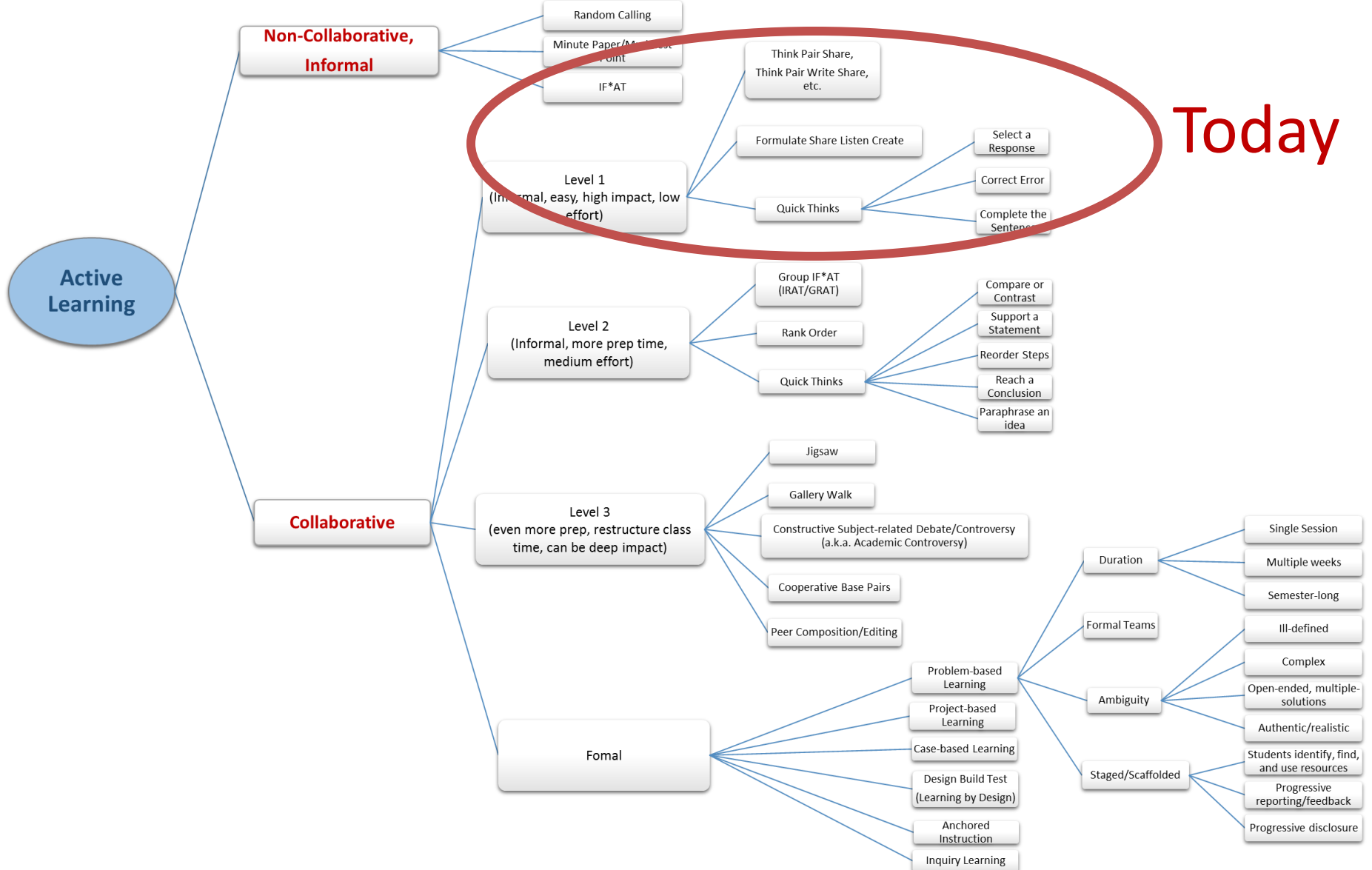
# Muddiest Point

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- What is the muddiest point in \_\_\_\_\_?
- Students jot down a short answer
  - Mechanism to collect in class – review?
    - *How might that be done?*
  - An example of “Just In Time” teaching
- Maybe at end of the class – collect
  - Start next class going over problem-areas
- Easy to do – harder to respond (faculty)
  - Can’t just give the same “lecture” again
  - Possibly use another activity to help?

# More about Active Learning

Today



# KEEN Summer Workshop

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Active  
Collaborative  
Learning

Problem  
Based  
Learning

Entrepreneur  
-ial Minded  
Learning

**What:** KEEN Summer Workshop on ACL, PBL and EML

**When:** May 23-26, (3.5 days)

**Where:** On Campus at WNE

**Compensation Stipend:**

\$750 paid upon completion of May Workshop 2016

\$1000 paid upon completion of report-outs (meetings and written report)

**Contacts:**

Rob Gettens (Engineering)

Jennifer Mallory (Engineering)

Lanny Spotts (Business)

Marilyn Pelosi (Business)

Liang Niestremski (A&S)